

**WHAT IS CLAIMED IS:**

1. A gas scrubber comprising:
- 5 a combustion chamber;
- a wetting chamber placed below said combustion chamber to form a single unit;
- 10 a guide plate arranged between the combustion chamber and the wetting chamber for directing a gas from the combustion chamber into the wetting chamber; and
- 15 an injection nozzle having an opening adapted to deliver a conditioned gas above the guide plate for minimizing the production and/or accumulation of a powder at an interface between the combustion chamber and the wetting chamber.
2. The gas scrubber according to claim 1, wherein the combustion chamber is adapted to burn a flammable gas delivered to the combustion chamber.
- 20 3. The gas scrubber according to claim 1, wherein the wetting chamber is adapted to receive water which absorbs a portion of the gas directed from the combustion chamber that is not burned.
- 25 4. The gas scrubber according to claim 1, wherein the wetting chamber comprises:
- an angled bottom surface which collects particulates from the gas that is not burned; and
- 30 a water expulsion nozzle having an opening directed to the angled bottom for flushing the particulates into a drain which opens into the wetting

chamber.

5. The gas scrubber according to claim 1, wherein the wetting chamber comprises:

5 a plurality of water drenched absorbers across which the gas is directed; and

an exhaust pipe having an opening extending into the wetting chamber for receiving the directed gas after said gas is passed across at least a portion of the water drenched plurality of absorbers.

10

6. The gas scrubber according to claim 1, wherein the gas delivered from the combustion chamber is a relatively high temperature gas that cools as it traverses the plurality of water drenched absorbers, and wherein the conditioned gas is delivered above the guide plate such that the gas delivered from the combustion chamber does not directly  
15 contact a substantial portion of the cooler gas that traverses the plurality of water drenched adsorbers.

7. A gas scrubber comprising:

20 a combustion chamber for eliminating explosive and flammable elements contained in a gas delivered into the combustion chamber from a gas intake;

25 a wetting chamber placed below said combustion chamber to receive the gas and dissolve a water soluble element of the gas which is not burned in said burning chamber; and

30 a means for minimizing a powder produced due to a temperature difference between said combustion chamber and said wetting chamber at an interface between said burning chamber and said wetting chamber.

8. The gas scrubber according to claim 7, wherein said combustion chamber comprises:

a case connected to receive the gas intake and an air intake; and

a heating means placed in the inside of said case for applying heat to the gas flowing into said case from the gas intake.

9. The gas scrubber according to claim 7, wherein said heating means includes:

a heating chamber;

multiple heat exchange units arranged within rows inside said heating chamber, wherein each of said heat exchange units comprise an electrical heating element configured inside a ceramic; and

a pair of cleaning air nozzles installed on both upper sides of said heater chamber for periodically delivering air across the ceramic surface of the heat exchange units to minimize accumulation of powder upon an outer surface of the ceramic.

10. The gas scrubber according to claim 9, wherein each of the multiple heat exchange units comprise an insulator, such as quartz, configured between an outer surface of the heat exchange unit and the ceramic in order to prevent the short between the electrical heating element and the outer surface of the heat exchange unit.

11. The gas scrubber according to claim 7, wherein each of the multiple heat exchange unit comprises an Inconel valve.

12. The gas scrubber according to claim 9, wherein the combustion chamber comprises a nitrogen delivery nozzle having an opening directed into the heating chamber

for supplying nitrogen across a clamp which connects the multiple heat exchange units to an electrical power conductor.

13. The gas scrubber according to claim 9, wherein the multiple heat exchange units are arranged in two substantially parallel rows and are connected the electrical power, whereby if power to one row of the multiple heat exchange units is terminated, power to the other of row of the multiple heat exchange units will receive a double amount of power.

14. The gas scrubber according to claim 7, wherein a water jacket is installed on said gas intake in order to cool the gas within the combustion chamber and prevent high temperature and high pressure said gas from flowing backward into the gas intake.

15. The gas scrubber according to claim 7, wherein said wetting chamber includes:

a case having a region centralized within the case, around which a plurality of partitions are formed to direct passage of the gas through the case from said combustion chamber;

a plurality of absorbers installed in the gas passage formed by the partitions of said case, said plurality of absorbers at least partially drenched in water for dissolving water soluble elements contained in the gas as the gas flows through the absorbers and along the passage;

a shower nozzle having a water delivery opening directed above each of said plurality of absorber for drenching said plurality of absorbers; and

an exhaust pipe having an opening extending into the case for expelling a portion of said gas to an ambient outside of said case.

16. The gas scrubber according to claim 15, wherein a bottom portion of said case is

configured in a v-shape to collect particles entrained within water residing within said bottom portion, said bottom portion further comprising a drain valve and a water nozzle coupled on a lateral side of the v-shaped bottom.

- 5     17.     The gas scrubber according to claim 16, further comprising a sensor placed above the drain valve to monitor the water level, and send a signal to initiate said water nozzle to inject water to push the water-entrained particles, or sludge, out to the drain valve when the sludge gathered at the v-shape bottom reaches a certain amount and causes rise of the water level.

10

18.     The gas scrubber according to claim 16, wherein a pressure tube is placed in the space between said case and a valve arranged within the drain to monitor the pressure such that the pressure within said wetting chamber is maintained at a constant level, and thus the water level is also maintained at substantially the same level regardless of the variation of an exhaust gas pressure.
- 15

19.     The gas scrubber according to claim 15, wherein a transparent plate is hinged on one side of said case so that the water level can be checked from outside.

- 20     20.     The gas scrubber according to claim 15, wherein an inner surface of said case and an inner surface of the exhaust pipe are coated with Teflon.

21.     The gas scrubber according to claim 15, wherein said means for minimizing a powder includes:

25

a guide plate attached with two plate materials having a square funnel-shaped guide configured to guide the gas from said combustion chamber to said wetting chamber; and

- 30     an injection nozzle installed on all four sides of said guide plate to inject air or nitrogen above the guide plate for removing the powder from the guide



plate through an opening formed by the funnel-shaped guide.

09287602-040799